

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of
Akira Utsumi

Appln. No.: 09/460,361 Group Art Unit: 1771

Filed: December 13, 1999

For: Nonwoven fabrics-laminate, and an automotive internal
trim panel

DECLARATION UNDER 37 C.F.R. 1.132

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

I, Akira UTSUMI, citizen of Japan, residing at c/o
Japan Vilene Company Ltd., 1-11, Katsube 4-chome,
Moriyama-shi, Shiga 524-0041, Japan, do sincerely and
solemnly declare:

THAT I am by profession a chemical engineer having
earned a Master degree in chemical engineering from
Kanazawa University in March, 1984;

THAT since April, 1984, I have been an employee of
Japan Vilene Company Ltd., and since April, 1996, I have
been engaged in the development of automotive internal trim
panels;

THAT I am the inventor of the invention of the
above-identified U.S. Patent Application (referred to as

"the present invention" hereinbelow) and therefore, am completely familiar with the present invention;

THAT I have reviewed and understand the first Office Action of March 1, 2002 and the final Office Action of July 17, 2002, and U.S. Patent No. 6,102,465 (referred to as "the Nemoto et al. Reference" hereinbelow) and U.S. Patent No. 6,312,542 (referred to as "the Nagata et al. Reference" hereinbelow); and

THAT in order to show the patentability of the present invention over the Nemoto et al. Reference, in view of the Nagata reference, the following experiment was carried out under my direction and supervision.

EXPERIMENT

(1) Preparation of a merely-entangled nonwoven fabric sheet having an average tensile strength of 150 N/50 mm width

A merely-entangled nonwoven fabric sheet having an average tensile strength of 150 N/50 mm width (referred to as "nonwoven fabric sheet A" hereinbelow) was prepared in accordance with the procedure described in Example 1 of the specification of the present application.

More particularly, a 50 mass % of stereoscopically crimpable, hollow polyester-based fibers (fineness = 13 denier; fiber length = 51 mm; cross-sectional shape = circle) which were composed of copolymeric polyester (melting point = 245°C or more) and polyethylene terephthalate in such a manner that they were laminated in the cross-section, and contained a void continuously extending in a lengthwise direction of the fiber at a center of the cross-section (cross-sectional shape of the void = circle), and a 50 mass % of sheath-core type, heat-

fusible polyester-based fibers (fineness = 2 denier; fiber length = 51 mm) composed of a fusible sheath component of copolymeric polyester (melting point = 160°C; heat of fusion = 15 J/g) and a nonfusible core component of polyethylene terephthalate (melting point = 260°C) were mixed and the fibers were then carded by a carding machine to form a unidirectionally orientated fiber web.

The resulting unidirectionally orientated fiber web was mounted on a plain weave net (mesh opening = 0.175 mm). A water jet (E value = 13) was ejected onto the unidirectionally orientated fiber web from a nozzle plate (internal pressure = 10 MPa) containing a line of nozzles having a diameter of 0.13 mm and a pitch of 0.8 mm. Thereafter, the unidirectionally orientated fiber web was reversed, and then a water jet (E value = 6.4) was ejected from the same nozzle plate (internal pressure = 7 MPa). Further, the unidirectionally orientated fiber web was reversed and a water jet (E value = 6.4) was ejected from the same nozzle plate (internal pressure = 7 MPa) to entangle the fibers and obtain a merely-entangled nonwoven fabric sheet (area density = 100 g/m²; thickness = 1 mm; apparent density = 0.1 g/cm³). An average tensile strength of the merely-entangled nonwoven fabric sheet (nonwoven fabric sheet A) was 150 N/50 mm width.

(2) Preparation of a merely-entangled nonwoven fabric sheet having an average tensile strength of 85 N/50 mm width

A merely-entangled nonwoven fabric sheet having an average tensile strength of 85 N/50 mm width (referred to as "nonwoven fabric sheet B" hereinbelow) was prepared in accordance with the procedure described in Comparative Example 1 of the specification of the present application.

More particularly, the procedure described in the

above item (1) was repeated to prepare a unidirectionally orientated fiber web. The resulting unidirectionally orientated fiber web was treated with a needle punching (needle density = 350 needles/cm²) to entangle the fibers and obtain a merely-entangled nonwoven fabric sheet (area density = 100 g/m²; thickness = 2.2 mm; apparent density = 0.045 g/cm³). The average tensile strength of the merely-entangled nonwoven fabric sheet (nonwoven fabric sheet B) was 85 N/50 mm width.

(3) Evaluation of an acoustic property

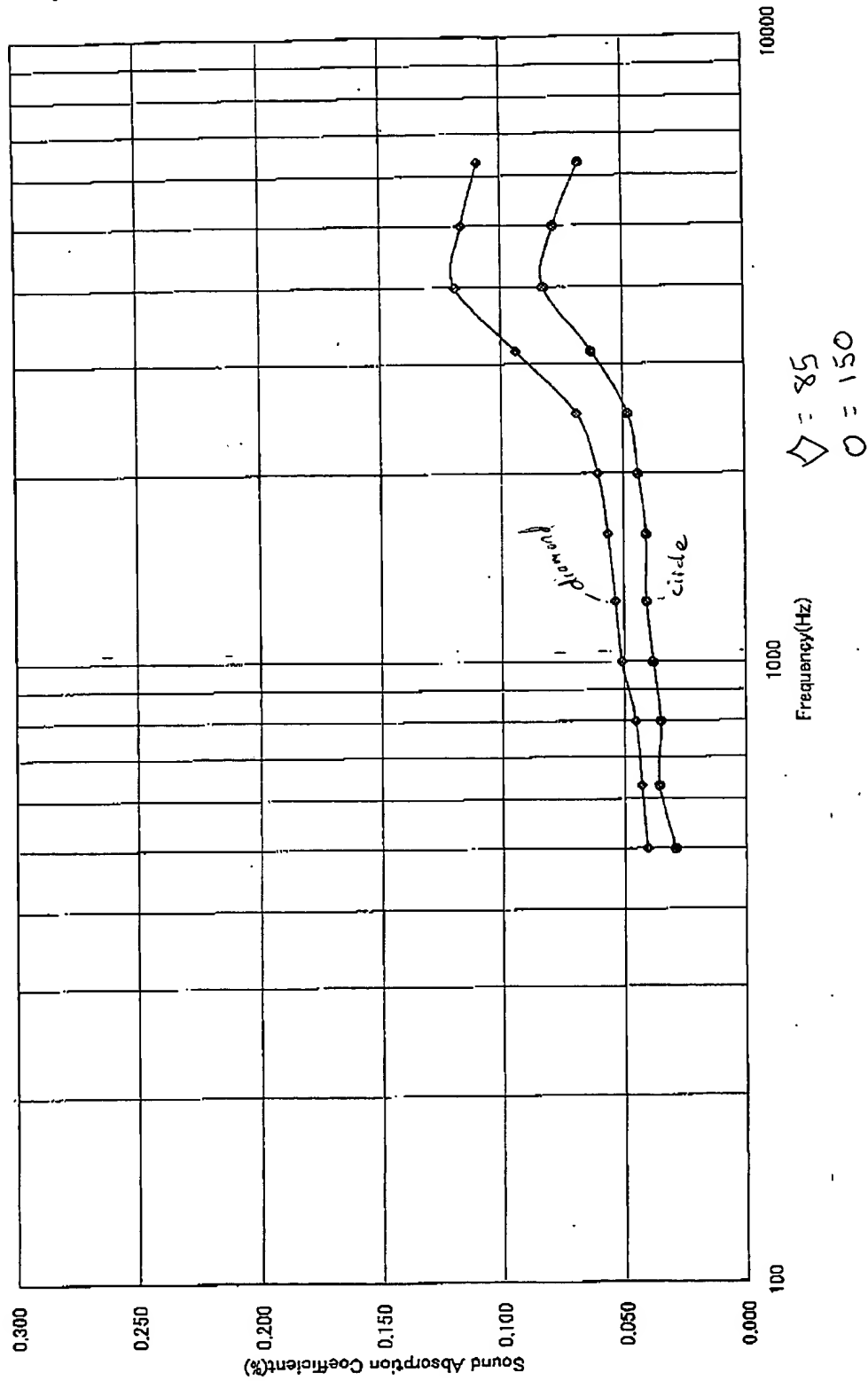
As an acoustic property of nonwoven fabric sheets A and B prepared in the above items (1) and (2), sound absorption coefficients in a range of 500 to 6300 Hz were measured with a Two-microphone Impedance Measurement Tube apparatus (Type 4206; Bruel & Kjar) using a tube having an inside diameter of 29 mm.

A measurement in each frequency was carried out twice, and each average value thereof is shown in Fig. 1. In Fig. 1, the symbol "●" means a sound absorption coefficient of the nonwoven fabric sheet A (an average tensile strength = 150 N/50 mm width), and the symbol "◆" means that of the nonwoven fabric sheet B (85 N/50 mm width).

RESULTS

As shown in Fig. 1, the sound absorption coefficient in nonwoven fabric sheet B (◆) was higher than that in the nonwoven fabric sheet A (●). This result shows that the increased average tensile strength of a nonwoven fabric sheet results in a poorer sound absorption.

[Fig. 1]



I, the undersigned declarant, declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001, or Title 18, of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Singed this 10th day of October , 2002.

Akira Utsumi

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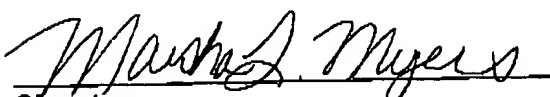
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I hereby certify that these papers are being facsimile transferred to the United States Patent and Trademark Office on the date shown below.

Marsha L. Myers
Secretary to Jay P. Lessler

April 9, 2003


Signature